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ABSTRACT

This report presents the results of a three-year educational partnership that supports a unique interdisciplinary team approach to professional development. The Sage Colleges collaborated with two school districts to enable educators to align content and standards; draw upon a bank of assessment vehicles, questions, and assignments; create classrooms in which students are able to make content connections across the curriculum; and develop an interdisciplinary pool of educators capable of addressing the future needs of standards-based professional development. The elementary, middle, and high school teams achieved this outcome through different experiences. This report focuses on the experiences of the elementary school team in mapping their curricula, developing connected classroom projects, and creating generic assessment tools and rubrics. (DDR)

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CONNECTIONS

An Interdisciplinary Team Approach to Professional Development

Elementary Team

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CONNECTIONS: An Interdisciplinary Team Approach to Professional Development

Elementary Team

A Partnership of

City School District of Albany
Niskayuna Central School District
The Sage Colleges

COUNCIL FOR CITIZENSHIP EDUCATION
Troy, New York

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Also available:

CONNECTIONS: An Interdisciplinary Team Approach to Professional Development, Middle School Team

CONNECTIONS: An Interdisciplinary Team Approach to Professional Development, High School Team

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Preface

Recent years have witnessed serious efforts by national organizations, state education departments, and local school districts to restructure education from within the classroom by developing new standards for what students learn and how teachers teach. Every so often, this process must occur if classroom knowledge and behavior is to adapt to new ideas, information, and expectations arising out of the content disciplines, the field of education, and civil society.

Today is one of those times. However, if actual change is to occur in the classroom, there are two teacher needs that must be met: (1) teachers need to see concrete examples that demonstrate the desired focus of the standards; and (2) teachers need opportunities to translate standards into classroom use. We believe that these two needs *of* teachers can be met *by* teachers working together in interdisciplinary teams focused on the development of model assessment vehicles as a means of aligning content standards with both curriculum and instruction. This premise serves as the foundation for our project called, CONNECTIONS.

In 1994, the CONNECTIONS Project began as a three-year partnership with the City School District of Albany, Niskayuna School District, and The Sage Colleges. The project embodies a unique interdisciplinary team approach to professional development. Three teams were established from the outset – Elementary, Middle School, and High School – with educators from each partner institution represented on each team. The teams sought to achieve the following four outcomes: (1) educators who are able to align content and standards; (2) colleagues who are able to draw upon a bank of assessment vehicles and questions/assignments; (3) classrooms in which students are able to make content connections across the curriculum; and (4) districts which gain an interdisciplinary pool of educators capable of addressing future needs of standards-based professional development.

Each team achieved those outcomes in their own way and with different experiences. The following pages detail the experiences of the Elementary School Team in mapping their curriculums, developing a connected classroom project, and creating generic assessment tools and rubrics. Also included is a wonderful description of the team's exciting interdisciplinary fifth-grade project, *Pond Life*, as well as resources useful for its replication. They also provide an evaluation of their experience with CONNECTIONS by documenting the changes in their teaching in terms of planning, learning, instruction, and reflections. The comments in this section are both enlightening and inspiring.

One final note on the participants and this publication. The preceding list of participants includes all individuals who have been involved throughout all or part of the three years of the project along with those who served as coordinators and staff. This final publication describes the work of all three years of the project; however, only those listed as participants through 1997 and identified by an asterisk assisted in the writing of this publication. The information included on the following pages therefore reflects the status of the Elementary Team's work as of the end of the third year of the project. However, this is not an end to the exciting work initiated during the grant period. The classroom projects and assessment vehicles described herein continue to be refined and improved and will be utilized by team members and their colleagues for years to come.

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CONNECTIONS Elementary School Team

Introduction

The Elementary CONNECTIONS Team consisted of classroom teachers from grades 1, 4, 5, and 6; a reading teacher, a computer specialist, graduate students in education from Sage Graduate School, and a director of elementary education. The group had representation from the three partners – City School District of Albany, Niskayuna Central School District, and The Sage Colleges.

Settling into our three-year commitment, we began our work by developing a curriculum map to identify the curricular connections between and across subject areas and grade levels. We discovered that we needed to find an "essential question" that would inform and focus our curriculum map. We selected *choice* as the integrating theme for our design. During this first-year period, classroom projects were readied that would exemplify and be representative of a connected curriculum. The projects were designed and carried out in both districts and replicated in the following school year. As work progressed, attention was directed to the development of authentic assessment tools. The following describes the process and products devised in an effort to develop a connected curriculum.

Team History and Curriculum Mapping

Our three-year history can be viewed as a problem-solving process which began with a vision and ended with a product. Our process reflects a series of group decisions designed to reach the following specific goal:

> *The construction of an integrated, meaningful curriculum with explicit connections between content, assessments, and standards.*

The nine ongoing determinants and decisions that tell our history are posed as questions and answered below.

1. What kind of structure accommodates our cooperative effort?

At our first meeting we agreed enthusiastically to meet together regularly in the early evenings at participants' homes quite often for pot-luck dinner meetings. Throughout the project, we maintained this blend of socializing and work which resulted in regular attendance by team members and provided ample time for thorough discussions of the topics at hand. A pattern emerged which was comfortable for all – *whole group experiencing*. At our meetings we engaged in many of the following activities: brainstorming, presentation, modeling, revisiting, cross-checking, designing, and decision making.

2. How can each member of the team make a meaningful contribution to the process and product?

Our process allowed each member to contribute her unique expertise and to participate in determining the direction of the project. We began by sharing what we each knew and believed about learning and our teaching. Seven of our team members were actively exploring new strategies in their classrooms and reflected with the group.

The core interdisciplinary project, *Pond Life* (see the section, Project Description and Replication Plan), was constructed, refined, and documented by half of the members of the team, and it involved both school districts as well as a Sage student. This curriculum development project represented and utilized the following areas of expertise: K-6 classroom experience, reading, technology, science, gifted and talented, curriculum development, and inservice education.

3. How could we stay in line with the vision and requirements of the overall project?

Communicating and realizing the original vision, intent, and requirements of the project was challenging because teachers are not often empowered to create, invent, and construct curriculum cooperatively. We were to rely on our professional expertise as well as experimentation to adjust to this open-ended task set out before us. It was critical for us to distinguish between "requirements" and creation. Fortunately, our team included several members who had participated in writing the initial grant proposal. In addition, two coordinators functioned as liaisons between coordinator/leader meetings and Elementary Team meetings. Those individuals along with inter-team workshops helped us in the ongoing process of understanding "what this *could* look like."

4. What and how do we learn in order to create the product?

Our learning process began by determining what we already knew and what we needed to know. It was obvious that we each knew about classroom teaching and that we each had certain areas of expertise. Underlying our teaching experience, however, were our personal beliefs, values, and philosophies. As we worked together, we learned about the obvious and subtle differences that would eventually synthesize into a group effort.

At the onset, we found that we all knew how to integrate curriculum thematically and how to utilize multiple intelligence theory. As a group, however, we needed to know more about two key techniques: *curriculum mapping* and *rubric design*. We learned about different forms of curriculum integration and curriculum design from our own team members. Techniques for authentic assessment, in general, and rubric design, specifically, were addressed through inter-team inservice sessions by the Project Consultant, Giselle Martin-Kniep of Learner-Centered Initiatives.

As the project unfolded, we realized that we needed to learn how to formulate clear outcomes and indicators in order to apply our work to the classroom. The expert guidance of the consultant was invaluable in this area.

Perhaps most important, was the learning that came from the modeling we continuously provided for each other as we encountered obstacles and worked to put the pieces together. And certainly, the feedback received from the students themselves during classroom implementation helped us move toward our goal.

5. How do we choose and focus our curriculum content?

Our first meeting resulted in the selection of a curricular theme with the following criteria:

- Our theme should allow students to have a say in their learning.
- Our theme should provide for application to students' lives.

The topic of *choice* seemed perfect. We developed the following rationale for its importance:

> *Responsibility includes lifelong problem solving and decision making. The basis for making decisions lies in one's awareness of choices and their consequences.*

The next step was to relate this theme to curricular requirements. As we discussed what we taught (grades K-6), we became more confident in our topic. Our team worked laboriously to map the correlations between choice and current content topics. (See Question 6 below for a more detailed explanation.)

As we continued to explore the concept of choice, we began to reflect on what students would need to be able to do in order to make informed choices. Our discussion led to a list of skills necessary for wise decision making at any level, in any context. Those skills are listed in Figure 1.

Elementary Figure 1. Skills Necessary for Wise Decision Making at Any Level

Thinking	**Communication Skills**
Decision making	Language
Critical thinking	Ways to research
Metacognition	Research
Creative thinking	Interdependence
	Cooperation
Research	Conflict Resolution
Modeling	
	Self Management
Transfer to Real Life	Independence
Application (assessment)	Organization
	Responsibility

We now had both a theme which we could apply to required curricular areas and a list of skills underlying the learning process.

6. What form would our curriculum map take?

The first three requirements for the project were (1) selection of a curricular theme, (2) integration of curriculum disciplines around the theme, and (3) creation of a curricular map. As elementary teachers, we had solid experience in all three of these areas. So, we were ready to go beyond the thematic mapping and interdisciplinary designs we had been using for years.

We agreed to experiment with the curriculum design, *The Contextual Learning Systems Approach*, developed by Ed Clark. This type of design centers on developing contextual questions around a focus question. Curriculum developed with this model is conceptual and inquiry driven. The desired outcomes for contextual learning are skill-oriented but do not preclude content goals.

Immediately after selecting our theme, we used a contextual map to correlate our current K-6 curriculum with the theme *choice*. By working with and refining this model, we were able to do the following (see Appendix 1):

1. develop an essential question to focus both teaching and learning;
2. frame questions for student inquiry and assessment;
3. integrate our curricular theme contextually, i.e., across disciplines;
4. reference our current K-6 population;
5. map a progressing age-appropriate K-6 curriculum; and
6. demonstrate opportunities for students to make, evaluate, and compare choices in various contexts.

To cross-check our representation of the disciplines and skills listed, we brainstormed ways to move from the abstract toward classroom implementations. We projected that multiple intelligences and decision-making skills would serve this purpose. Forms were designed and refined to record units and lessons. (See Appendix 2.)

7. How do we link our theories to classroom practice?

As we looked at our conceptual map, the environmental "slice of the pie" stood out as the perfect focus for creating interdisciplinary teaching units. Perhaps it felt the most generic. We created a tentative K-6 topical continuum with possible unit selections for implementation during the following school year. (See Figure 2.)

Elementary Figure 2. Tentative Topics at Each Grade Level for K - 6

K	*Family*: Is my family ready for a pet?
1	*Classroom*: How can we organize our room? (Addresses counting and map skills.)
2	*Neighborhood*: What do I do in case of emergencies? (Who can help?)
3	*Rainforest (Biomes)*: Should the rainforest be preserved and why should it?
4	*New York State*: How have people's past decisions affected my state?
5	*Pond Life*: What can I do to help preserve the health of aquatic organisms and watersheds?
6	*Science/Public Policy*: What should we do about our dump filling up/closing?

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The fifth-grade *Pond Life* unit became the basis for our core project. (See the section on Project Description and Replication Plan for a detailed description of the *Pond Life* unit.) This topic provided a basis for:

- strong content area
- inquiry-based learning
- Albany-Niskayuna implementation
- six-teacher collaboration

As we learned about framing outcomes/indicators and rubric assessment in our second year, two Albany teachers and one Niskayuna teacher created specific outcomes/indicators, activities, and a rubric for the *Pond Life* unit. Sharing at team meetings inspired two other Albany teachers to explore new classroom strategies in related curricular areas. In the third year, the unit was implemented again with refined outcomes/indicators, activities, and rubrics.

In addition during the spring of the second year of the project, a second grade Niskayuna teacher collaborated with the team's technology and reading specialists on a project involving student choice called, *Classroom Seating Arrangement*. This project, although less complex than the *Pond Life* unit, resulted in the following applications of our theme *choice*:

- early primary students
- affective curriculum
- cooperative learning
- technology connection
- school connections

The implementation and documentation of these units exemplify what is known as action research—our teachers explored, experimented, collaborated, reflected, evaluated, discarded, revisited, refined, reevaluated, documented, and learned along with their students. Most important, all of the teachers on the team created new teaching activities and assessments that allowed the students to engage in making meaningful choices.

8. What form would a generic assessment framework take?

In order to be "generic," we knew that our model would need to be organized so that it could be replicated by teachers in any one of a variety of content areas. It would need to demonstrate clearly the connections between the following elements:

- required content (K-6)
- curriculum disciplines
- skills
- standards
- assessments

We wanted our model to reflect certain components underlying the teaching-learning process, as we viewed it.

1. Students need to "make meaning" in order to learn.
2. Learning can be sequenced/scaffolded K-6.
3. Learners access knowledge/skills through multiple modalities.
4. Learning is a holistic process.
5. Concepts and higher order thinking provide for the greatest transfer.

We used the following techniques to incorporate elements and values:

- a universal theme
- multiple intelligence theory to represent curriculum areas
- questions to drive student inquiry and assessments

Our final curriculum map (see Appendix 3) and forms for unit assessment were designed to demonstrate these connections (see Appendix 4).

9. How do you create without a map of the territory?

Our task was to create a model of integrated curriculum and assessments that would work in the classroom. To be truly meaningful, we recognized that this model would need to connect our divergent beliefs, school district and state requirements, emerging standards, the latest research, as well as what we believed to be most important for children to learn. We hoped to do this. Getting it to become real was our true challenge.

We began this process simply by getting to know one another and discovering what it is we already do. We realized that, as elementary teachers, we were grounded in making curricular connections. From the very beginning, we agreed to stretch beyond what it is we already do and break out of the confines of current conventional frameworks; that is, "to break the mold."

With these early decisions, we committed ourselves to a discovery process that was both developmental and constructive in nature. Gradually, as we repeatedly swung from comfort zone to uncharted territory, the project emerged. There were times when we worked conceptually and saw the big picture; there were other times when we got bogged down in repetition and detail.

As adult learners, our process required us to:

vision	brainstorm	decide
plan	refine	validate
negotiate	cross-check	evaluate
decide	explore	predict
reflect	question	tolerate
resolve	clarify	reality-check
disagree	revisit	communicate
discard	organize	model
contribute	experiment	conceptualize

In essence, we not only invented a model. We ourselves engaged in the process we envisioned for our students.

Project Description and Replication Plan

POND LIFE UNIT

We planned, developed, and executed an interdisciplinary fifth-grade unit on *Pond Life*. By design, throughout this unit, the learner is given choices to direct his/her own learning. Based on our experience, when this occurs the students "own the project," the level of motivation is more intrinsic, and they achieve a higher level mastery in the process. The following description includes a summary of the development process, the *framework* for the unit, and descriptions of the key lessons which we feel distinguishes this project from traditional pedagogy. Appendices 5-9 include resources to help replicate this unit.

From the beginning, we decided that our project would be driven by conceptual questions that revolve around the topic of *choice*. We felt that this could best be accomplished through an inquiry-based/ interdisciplinary approach. These questions are represented in Figure 3, "Model for Problem Solving."

Elementary Figure 3. Model for Problem Solving

Essential question: How do the choices I make affect my learning and my environment?

Problem: What do I need to learn about the pond to make wise choices?

Steps

1. *Planning*: What resources, skills, and information do I need?
2. *Obtaining Data*: What choices must I make to observe specimens and record data reliably?
3. *Organizing Data*: How can I organize the data I've collected?
4. *Analyzing Data*: Using what I've learned, what conclusions can I draw about basic life needs, the organisms, and interdependence?
5. *Decision Making*: What choices can we make to insure that aquatic organisms and their watersheds remain healthy?

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This model drives the unit. It is the framework within which the teacher facilitates student learning. Once the "Model for Problem Solving" is introduced, the *Pond Life Unit* begins with a unique set of introductory activities.

Planning

What resources, skills, and information do I need?

After listening to an environmental audiotape of a pond which stimulates the students' senses, they reflect and record their knowledge of ponds, both in writing and with illustrations. First individually and then in small groups, students generate a list of questions they want to have answered. (Have the students begin to create a "KWL" chart—what the student *Knows;* what the student *Wants* to find out; and what the student *Learned.*)

This reflection is recorded by students on class wall charts. Focusing on the section of the KWL chart, "What we want to find out," students classify their questions into topics to direct small-group research, (e.g. types of ponds, survival, food chain, kinds of plants, kinds of animals, etc.). After they have had ample time to conduct research, small groups decide on effective ways to share what they had learned with the rest of the class. We found it wise to allow several class periods for planning, creating, and practicing presentations.

It became clear as the activity progressed, that the degree of background information and richness of resources used by the students was much greater than originally anticipated. (Who said you couldn't kill two mallards with one stone?) So much so, that students' final presentations of their research eliminated the need for the teacher to cover previously planned concepts such as the food chain.

Most likely, this came about as a result of discussions *prior* to presentation planning. By addressing the question, "What makes for an excellent presentation?" a list of attributes was generated to be used as a guide for planning and evaluation. Included in this discussion was the key concept that whatever was shared by the presenter should actually be *learned* by the audience, and that the presenter should have a way to *know* that this had occurred! Both teachers and students had an opportunity to provide this feedback through the rubric "Performance Standards for Exhibition" which lists key criteria for judging presentations. (See Appendix 5.)

At this point, much of the *planning* portion of the "Model for Problem Solving" had been addressed, leaving the teacher to fill in any gaps in information (e.g., pond life vocabulary, spelling, etc.) and skills (e.g., use of equipment such as magnifiers, pocket scopes, and/or microscopes) through traditional lessons. All of this was in preparation for the next stage, *Obtaining Data.*

Obtaining Data

What choices must I make to observe specimens and record data reliably?

This stage was launched by a field trip to a pond. One of our local environmental centers provided an excellent opportunity for students to observe and collect pond specimens with the assistance of field experts.

While at the pond's edge (or immediately upon returning to the classroom with pond samples), students were given the opportunity to observe and draw 2-3 specimens and provide some key information about what they observed. Information was recorded on "Pond Investigation Sheets" which require students to draw a picture of the plant or animal observed and answer questions about pond animals such as, *How does it move?* and *What might it eat?* Later that day, the teacher compiled a sheet which showed several student drawings of the *same* specimen to be used in next period's lesson on reliable observations.

The next day, students were presented with a sheet of "same specimen drawings" which showed samples of student observations with divergent responses and were asked, *"What would you want to ask to determine which drawing was most reliable and why?"* Questions should be asked about the following:

- the observer,
- the conduct of the observation,
- how the information was recorded, and
- whether it could be corroborated by others.

We found it helpful and effective for the teacher to model this process and that this activity worked best in a "Think/Pair/Share" format. The resulting discussion with the students provided a prime opportunity to demonstrate that the choices we make in terms of effort, use of time, choice of equipment, and focus on task, have a direct effect on the reliability of our observations thereby revisiting our essential question: *"How do the choices I make affect my learning and my environment?"*

During the next two to four weeks, the students independently observed pond life specimens, documenting specific observed information for future use on an "Organism Observation Form." Information to be recorded includes a reliable drawing and description of the organism; instruments and magnification used to observe; information about movement, food, and other observable characteristics; etc. The previous "reliable observation" activity proved to be helpful in insuring accuracy because it had significantly heightened student awareness. We found that this was equally effective when the students worked individually as well as in small groups. Additional organism information was obtained through further research including the use of technology and technological resources to gather information.

Also during this time, students were given the opportunity to enlarge one of their reliable drawings using graph paper and their knowledge of proportion and scale. (This afforded an excellent opportunity to teach both of these mathematical concepts!) As an Art tie-in, once the enlargements were made, the Art teacher taught a lesson on the technique of pointillism, developed by Georges Seurat, so that the students could color their enlargements in this style. We found this to be an excellent cooperative group activity!

As a Language Arts tie-in, the students read the poetry book, *Joyful Noises: Poetry for Two Voices* by Paul Fleischman, with a focus on the pond creature poems. The students created their own two-voice poems for the pond creatures they were studying. As an additional or alternative activity, students can write first-person point of view short stories on one of the creatures they studied or on a "Create-a-Creature."

With an eye to the next stage, students had an opportunity to examine student *Pond Life Book* exemplars from a previous year for the purpose of determining, "What makes for an excellent *Pond Life Book*?" In cooperative groups, students listed the common distinguishing attributes they found in the student exemplars to create a descriptive list of characteristics of an "excellent" *Pond Life Book*. (See Appendix 6.)

Organizing Data

How can I organize the data I've collected?

In order to guide students as they organized their data into *Pond Life Books*, a student-generated rubric needed to be developed. It is highly recommended that the teacher go through this thinking process of developing their own rubric *prior* to developing one with the students; this enables better coaching of the students through this process.

To create the rubric, we first charted the list of attributes generated by the cooperative groups during the previous activity and examined each one for clarity making changes where needed. For example, when students suggested that the content be descriptive, the question was asked, "What would descriptive content look like?" In response the students quickly replied, "It's where pictures are suggested in the reader's mind." Or, when students said "Information should be complete," the teacher asked, "How would you know if it was complete?" They responded, "It would leave the reader with a thorough understanding of the organism," and so on, for each attribute.

Once the language was defined, the class then grouped the attributes into categories such as organization, presentation, content, focus/purpose, and writing style. Next, we discussed which of the above categories was

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most important to consider first, second, third, and so on. We now had a categorized and prioritized list of attributes that defined for the class a "high quality" *Pond Life Book*. Moving from this list to an actual rubric can be done with the class, a small group of student representatives, and/or by the teacher(s) themselves.

What remained to be defined at this point were the other levels of the rubric. The students decided that "high quality" equaled a "3" on a scale of 1-4. They then gave names to the other three levels: superior (4), fair (2), and inferior (1). From there, the teacher team created appropriate descriptors for each of the remaining three levels. This was done by using different qualifying words with the same attribute vocabulary. Our rubric development went through several revisions, and we found that the simpler and more concise our rubric became, the better it was. Over time, it became clear that a rubric is never really final, but in a constant state of revision.

The final rubric (see Appendix 7), "Pond Book Guidelines" (see Appendix 8), and "Pond Life Planning Guide" (see Appendix 9) were filled out by each student to define their project (i.e., purpose, audience, description of project, materials needed, calendar plan, evaluation, etc.). This provided the guidance needed for students to complete this project independently. A "Project Reflection Guide" posed the questions, What are you trying to accomplish? What decisions have you made? What's strong about your project? What's weak about your project? and What do you need to do next? These are the questions that students completed at regular intervals to evaluate their progress. This also proved to be highly effective.

Analyzing Data

Using what I've learned, what conclusions can I draw about basic life needs, the organisms, and interdependence?

Once the students were nearing completion of their books, they were in a position to consider this question and in fact did so in a "Reflection" or "Author's Note" section of their pond books. Also appropriate for this stage is an analysis of the *Pond Life Book* development process including successes and failures they encountered while completing their project. Inclusion of this analysis in the *Pond Life Book* adds an element of authenticity.

Decision Making

What choices can we make to insure that aquatic organisms and their watersheds remain healthy?

At this point, we felt that the students needed to obtain more information about watersheds and human impact from a local perspective. Speaker(s) from the local water district were invited to share their expertise with the students. Also, a watershed model from our local county planning board was used for a demonstration, which proved to be very effective.

This provided a very strong foundation from which to do a *Land Use Simulation*, which can also be used as an additional assessment. In this simulation, students were given the opportunity to decide on the land use for a wetlands area. They did this in cooperative groups each representing various special interests. After each group reached a decision on its proposal, they presented their land use plans in a "Town Meeting Forum" where one representative from each group presented their land use idea to the residents of the town. The residents listened, asked questions, and finally voted to approve or disapprove the land use idea using the criteria established for the *Land Use Simulation*.

Once we completed the land use activity, we asked the students to reflect on their work by answering the key decision-making question that frames this stage in terms of their own personal use. What resulted from this was unexpected, *the students suggested the possibility of formalizing their thinking in a letter to the local newspaper in an effort to inform and persuade citizens to be more mindful of their choices involving land use in their community.*

Students proceeded in cooperative groups to write persuasive letters which they revised

several times using such evaluation tools as rubrics and checklists of key criteria for this genre. Motivation was strong and students took on the task of doing additional research on-line by contacting community resources (New York State Department of Environmental Conservation, etc.) and getting feedback on their drafts from the speaker who had visited the class (the town commissioner of public works). The final letters were effective, so much so that with minor changes we decided to send them not only to the local papers but to local and state government officials for their response. One letter was even published!

The above description provides the reader with a framework ("Model for Problem Solving") and our process for developing key lessons and assessment tools. We have concluded through our experience that the *Pond Life Unit*, in fact any interdisciplinary unit that focuses on *choice*, is ever-changing. Reflection upon what worked and what did not work in the classroom led to numerous "fine tunings." Yet it was agreed that the richness of the unit's activities and the inclusion of student input in creating assessment vehicles resulted in exemplary student work.

Generic Assessment Tools and Rubrics

Background

During the first two years of our work all of the CONNECTIONS teams participated in a series of comprehensive inservice workshops that explored the topic of assessment. As we moved from curricular mapping to essential questions, outcome statements, and indicators, the Elementary Team's collective vision of authentic assessment grew and developed. Informed by our day-to-day classroom experiences, our core project on *Pond Life*, and our team meetings we continued to refine and revise our vision.

Authentic Assessment

Assessment tools need to be authentic, in other words they need to be modeled after real life or at least plausible tasks and challenges. They need to be driven by outcomes, indicators, and objectives that define what students ought to know, be able to do, and be like. This information needs to be observable, measurable, and clearly stated. Ideally, assessment tools should also be integrative, flexible in terms of learning styles and strategies, and designed to prompt self-reflection.

It should be noted that the development of assessment tools is a dynamic ongoing process impacting curriculum. It actively involves students and their teachers. As the assessment tools become more precise they support positive growth and change.

Standards and Expectations

Authentic assessment involves "knowledge-in-use." It requires the development of criteria that must be met if the completed task is to be considered of high quality. It requires models or exemplars that clearly depict desired results in ways students can understand. Statements that specify the level or quality of a student's performance become performance standards while rubrics or scales differentiate these levels of performance.

Types of Rubrics

The purpose of the assessment will determine the type of rubric. Rubrics can be either analytical—designed to include diagnostic information; or holistic—capturing the whole of a product. They may be task-specific. For example, a rubric or scale might be designed to differentiate between levels of performance on business letter writing. A developmental rubric would spell out a continuum of behaviors. Furthermore, rubrics can be designed to reflect levels of group performance as well as individual performance.

Through our work we have developed a *Generic Rubric Assessing Choice*. This rubric sets out standards relating to students and the concept of choice and the levels of attainment for each of those standards. (See Appendix 10.)

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Uses of Rubrics

Rubrics help students to monitor their performance and achievement. They clarify what is required and identify the attributes of exemplary work. They help justify and validate grades and convey criteria and expectations for both students and parents.

Designing a Rubric

A rubric is a scale that requires specific, objective language to describe observable and measurable characteristics that identify and categorize outcomes. Rubrics may be designed by teachers or co-authored with students, and the development of rubrics includes ongoing analysis and refinement. See Figures 4 and 5 for two models of rubric design.

Elementary Figure 4. Rubric Design by the Teacher

Stage I: Design

- Define the purpose.
- Identify the outcomes and indicators stressing substance.
- Cluster and prioritize descriptors using specific language.
- Devise levels of performance.

Stage II: Refining

- Sort completed work using the levels of performance devised.
- Analyze and describe each level.
- Revise descriptors as needed.
- Modify task, rework outcome statements, etc., as needed.

Elementary Figure 5. Rubric Design with Students

Stage I: Design

- Show exemplars or models if possible.
- Ask what each shows about what the author knows and can do? Is it high quality?
- List indicators provided by students.
- Clarify vague statements.
- Cluster, prioritize, and describe levels.
- Chart and display results as a first draft.

Stage II: Revising with Students

- Redraft as needed as work progresses.
- Use student work to illustrate and apply rubric levels.
- Students evaluate rubric in terms of completed task.

Evaluation

The development of an integrated curriculum product led to many changes in our teaching over the past three years. The following section lists those changes and evaluative comments grouped under four areas: planning, learning, instruction, and reflections.

I. Planning

- Student choice is included in the planning stage.
- Planning is now interdisciplinary and shared with colleagues.
- Learning opportunities and assessments are "real life."
- Working from the end(s) we would like to achieve and allowing the steps to be constructed by the students.
- The planning stage includes thinking more about assessment.

II. Learning

- Students use rubrics to guide and assess their own work.
- Students feel supported and safe in expressing understanding and needs.
- Students have an increased investment and are aware of the choices that are available.
- Multiple intelligences are incorporated.
- Students are more energized and engaged.
- Students are able to communicate valuable learning experiences.
- Thematic connections allow in-depth learning resulting in students going beyond task requirements.

III. Instruction

- Project work (as opposed to isolated lessons) connect to many disciplines with embedded assessment.
- There is time included for student self-evaluation/reflection.
- Instruction is geared around a problem-solving process that will allow for successful student achievement.
- Rubrics are developed with student input.
- From the outset, explore with students, "What makes for an excellent _____?"

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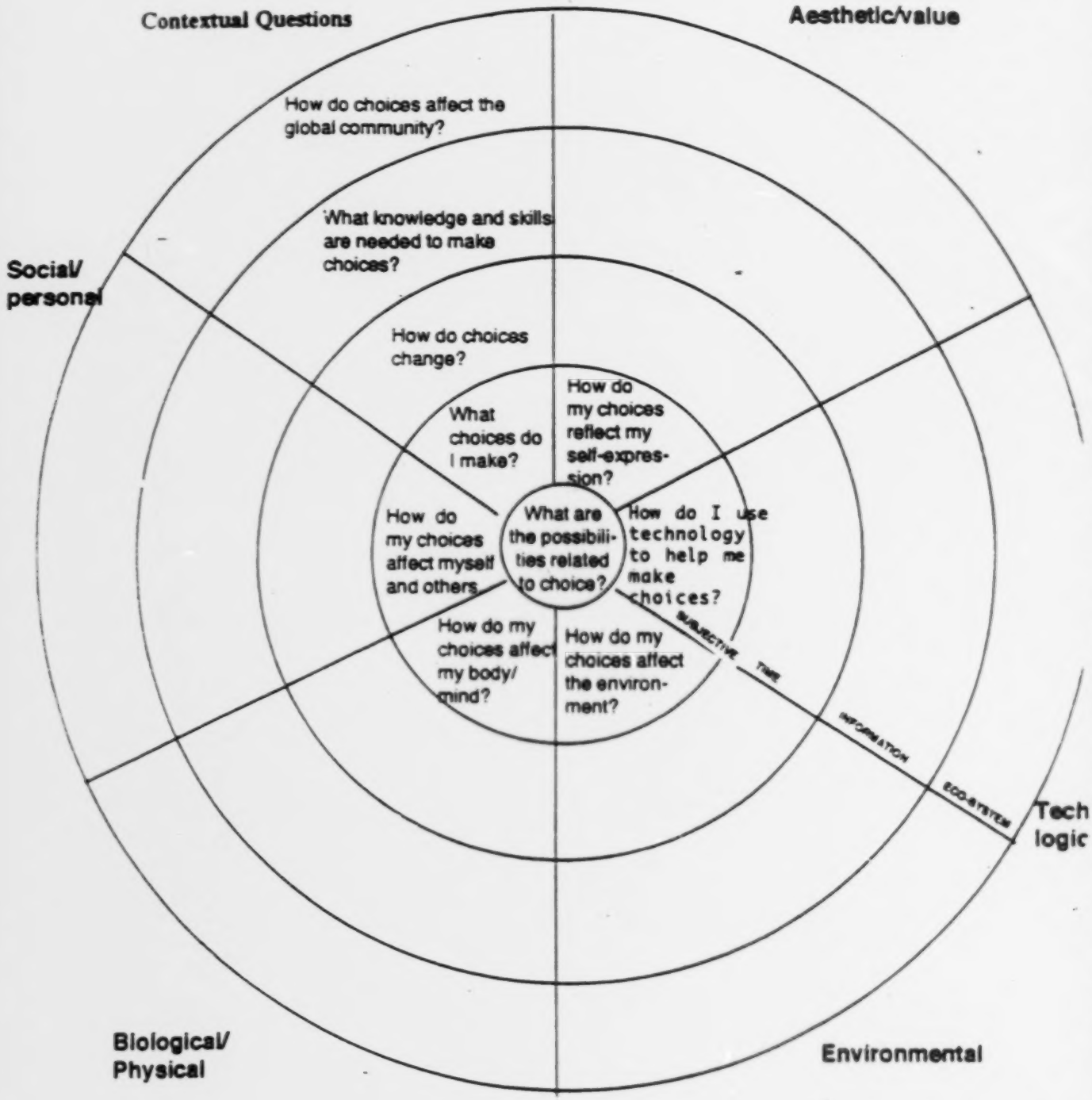
- Lessons are included that build critical thinking and decision-making skills with open-ended questions.
- Teachable moments utilize both teacher and student know-how.
- Connections sought between what the children know and bring to the classroom and what is being and will be learned.
- The classroom is more active with group activities, sharing, and cooperative learning.
- A constructivist approach to learning is employed.

IV. Reflections

- Our product is an accomplishment; the process is elusive, ever-changing, and evolving.
- Less is more—an understanding of a few subjects in-depth is better than glossing over the surface of many.
- Changes in student behavior were noted such as: higher level of motivation, more actively involved in learning, striving for higher standards due to their investment.
- Process has allowed for action research in the raw.
- Other teachers can use our model as a guide to devise and use assessment tools of their own creation.
- Due to the interdisciplinary nature of the work, use of the core projects engenders team collaboration (across disciplines).
- Project can be used to upgrade already existing curriculum.
- Hopefully, teachers can start with generic rubrics reflecting a concept such as choice rather than specific content and begin to make connections.
- Teachers involved in projects such as this need to sustain themselves on an ongoing basis.

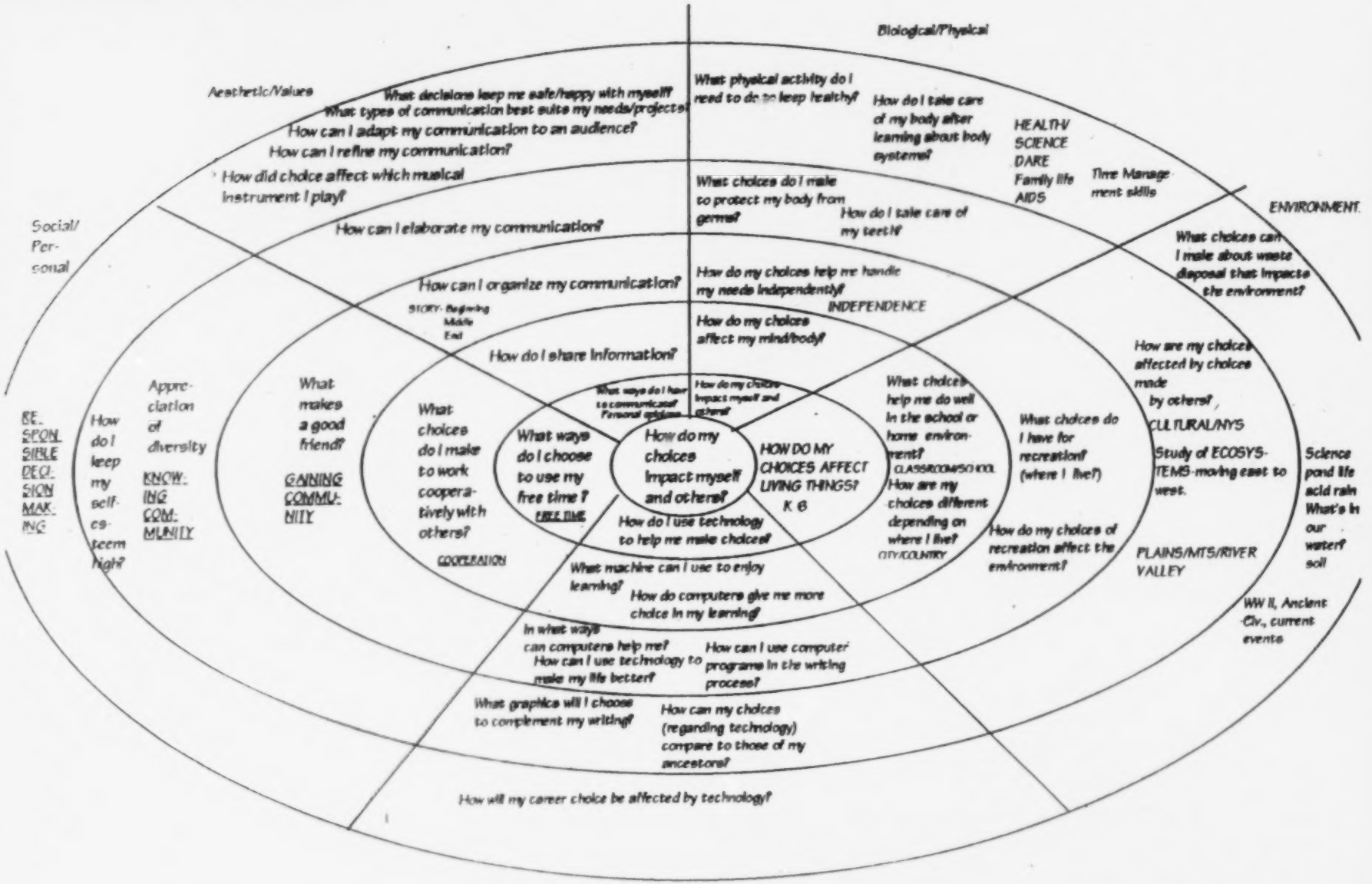
Appendices

A Preliminary Curriculum Map Involving Choice


Contextual Questions
Aesthetic/value
How do choices affect the global community?
What knowledge and skills are needed to make choices?
Social/ personal
How do choices change?
What choices do I make?
How do my choices reflect my self-expression?
How do my choices affect myself and others
What are the possibilities related to choice?
How do I use technology to help me make choices?
How do my choices affect my body/ mind?
How do my choices affect the environment?
SUBJECTIVE
TIME
INFORMATION
ECO-SYSTEM
Tech logic
Biological/ Physical
Environmental

For Connections Grant by Albany and Niskayuna Elementary Team February, 1995

Preliminary Curriculum Map 2


Biological/Physical
Aesthetic/Values
What declsions keep me safe/happy with myself?
What types of communication best suits my needs/projects?
How can I adapt my communication to an audience?
How can I refine my communication?
How did choice affect which musical instrument I play?
What physical activity do I need to do to keep healthy?
How do I take care of my body after learning about body systems?
HEALTHY SCIENCE DARE Family life AIDS
Time Management skills
What choices do I make to protect my body from germs?
How do I take care of my teeth?
How can I elaborate my communication?
ENVIRONMENT
Social/ Personal
What choices can I make about waste disposal that impacts the environment?
How can I organize my communication?
How do my choices help me handle my needs independently?
INDEPENDENCE
STORY- Beginning Middle End
How do my choices affect my mind/body?
How do I share information?
How are my choices affected by choices made by others?
CULTURAL/NYS
Study of ECOSYSTEMS-moving east to west.
PLAINS/MTS/RIVER VALLEY
Science pond life acid rain What's in our water? soil
WW II, Ancient Civ., current events
RESPONSIBLE DECISION MAKING
How do I keep my self-esteem high?
Appreciation of diversity
KNOWING COMMUNITY
What makes a good friend?
GAINING COMMUNITY
What choices do I make to work cooperatively with others?
COOPERATION
What ways do I have to communicate? Personal options
How do my choices impact myself and others?
What ways do I choose to use my free time?
FREE TIME
How do my choices impact myself and others?
HOW DO MY CHOICES AFFECT LIVING THINGS?
K-6
How do I use technology to help me make choices?
What choices help me do well in the school or home environment?
CLASSROOM/SCHOOL
How are my choices different depending on where I live?
CITY/COUNTRY
What choices do I have for recreation? (where I live?)
How do my choices of recreation affect the environment?
What machine can I use to enjoy learning?
How do computers give me more choice in my learning?
In what ways can computers help me?
How can I use technology to make my life better?
How can I use computer programs in the writing process?
What graphics will I choose to complement my writing?
How can my choices (regarding technology) compare to those of my ancestors?
How will my career choice be affected by technology?
TECHNOLOGICAL

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Making Choices

Topic: _____
Grade: _____

	Strategies						Intelligences						
Activities	**Thinking**	**Researching**	**Self-managing**	**Communicating**	**Applying**		**Verbal**	**Musical**	**Visual**	**Interpersonal**	**Mathematical**	**Intrapersonal**	**Kinesthetic**

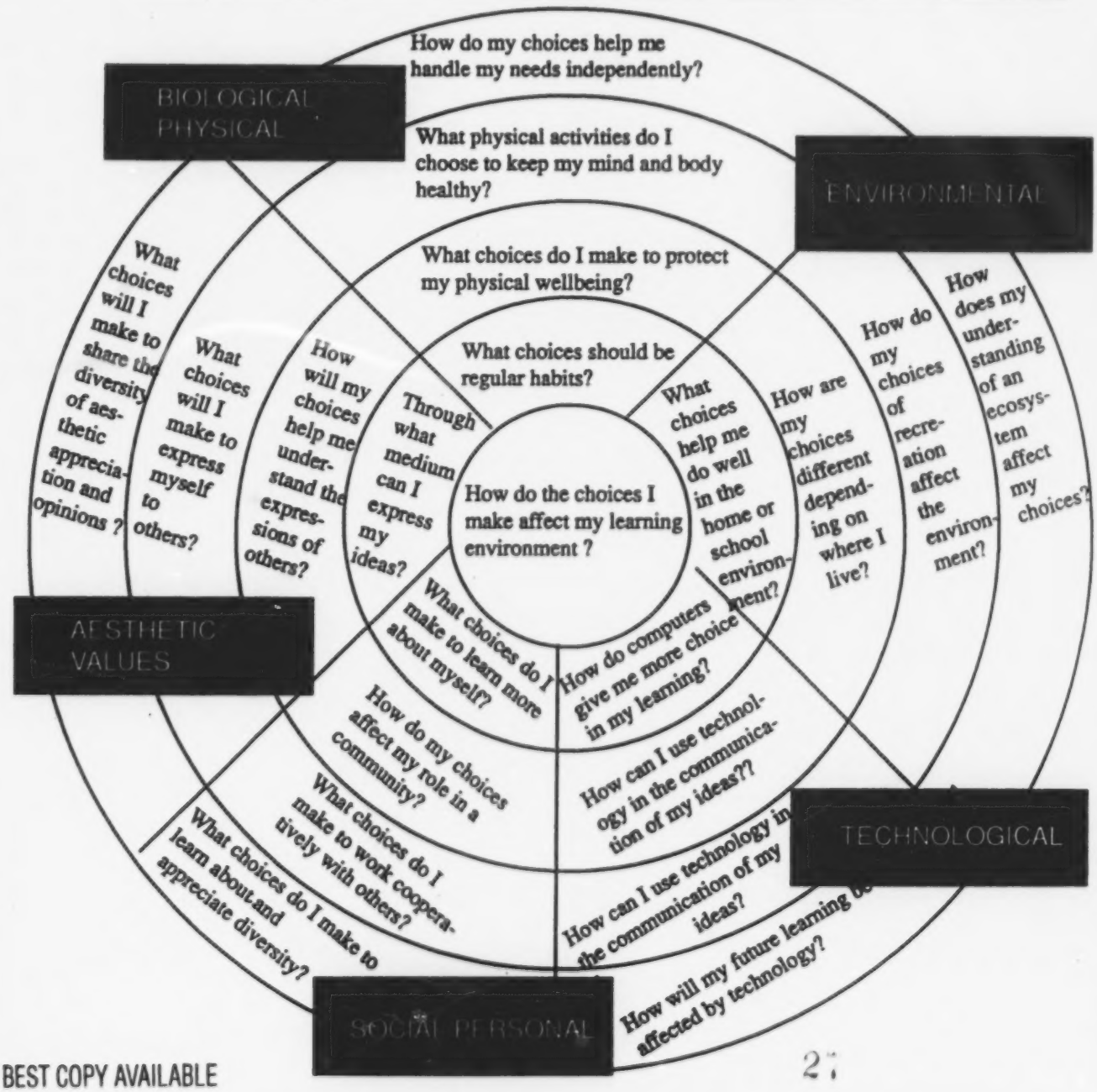
Making Choices

Topic: _____
Grade: _____

Activities	Strategies		Intelligences
WEEK ☐	Thinking ○		Verbal ○
	Researching ○		Musical ○
	Self-managing ○		Visual ○
	Communicating ○		Interpersonal ○
	Applying ○		Mathematical ○
			Intrapersonal ○
			Kinesthetic ○
WEEK ☐	Thinking ○		Verbal ○
	Researching ○		Musical ○
	Self-managing ○		Visual ○
	Communicating ○		Interpersonal ○
	Applying ○		Mathematical ○
			Intrapersonal ○
			Kinesthetic ○

Curriculum Map

Connecting the theme *Choices* to the current K-6 curriculum


How do my choices help me handle my needs independently?
BIOLOGICAL PHYSICAL
What physical activities do I choose to keep my mind and body healthy?
ENVIRONMENTAL
What choices do I make to protect my physical wellbeing?
What choices should be regular habits?
How do the choices I make affect my learning environment ?
What choices will I make to share the diversity of aesthetic appreciation and opinions ?
What choices will I make to express myself to others?
How will my choices help me understand the expressions of others?
Through what medium can I express my ideas?
What choices help me do well in the home or school environment?
How are my choices different depending on where I live?
How do my choices of recreation affect the environment?
How does my understanding of an ecosystem affect my choices?
AESTHETIC VALUES
What choices do I make to learn more about myself?
How do computers give me more choice in my learning?
How do my choices affect my role in a community?
How can I use technology in the communication of my ideas??
What choices do I make to work cooperatively with others?
How can I use technology in the communication of my ideas?
TECHNOLOGICAL
What choices do I make to learn about and appreciate diversity?
How will my future learning be affected by technology?
SOCIAL PERSONAL

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CONNECTIONS Elementary Appendix 4. Form for Unit Assessment

Making Choices

Topic: _____ **Date:** _____
Grade: _____

Activity:

Starting Lessons Sequence

Subject *(NYS Learning Standards)*		Strategies		Intelligences	
	Math		Thinking		Verbal	
	Science		Researching		Visual	
	Social Studies		Self-managing		Interpersonal	
	Language Arts		Communicating		Mathematical	
			Applying		Intrapersonal	
					Kinesthetic	

Essential Question: How do the choices I make affect my learning environment?

Outcomes:
- The students recognize the opportunity for choice.
- The students utilize knowledge and skills to make choices.
- The students recognize the impact of choice.
- The students recognize that choices may change.

Indicators:
- The students will identify what choices are available, understand and reflect on their choices, and organize their choices.
- The students will access and communicate prior knowledge; identify and choose areas for further study; find, interpret, and communicate relevant information; and act on their choices.
- The students will investigate the effects of choice and respect divergent choices.
- The students will communicate ideas effectively and evaluate the benefits and shortcomings for the choices made.

Process:

Materials:

Assessment:

CONNECTIONS Elementary Appendix 5. Pond Life Unit

Performance Standards for Exhibition

Student's (rater) Name (optional): _____
Student's (presenter) Name: _____
Topic: _____

Rating Key **not at all** **1** **2** **3** **4** **5** **excellent**

Criteria	Rating by Student	Rating by Teacher
Content was well researched		
Content was accurate		
Content was well organized		
Presentation used visuals or media		
Presentation was thought-provoking		
Voice was clear and understandable		
Presentation was interactive		
Student demonstrated self-confidence		
Student provided a context or introduction to the presentation		
Student provided a closure or conclusion to the presentation		

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CONNECTIONS Elementary Appendix 6. Pond Life Unit

Attributes of a High-Quality Pond Life Book

Well-Organized

- Sensible order
- Numbered sequence
- Sensible groupings of organisms, e.g., all nymphs together
- Table of contents: in front of book, well-organized, thorough
- Index: in back of book
- Glossary (with page references)
- Bibliography: document sources on each page
- About the author included
- Information is organized into paragraphs

Presentation

- Colorful sections: plants and animals
- Cover includes: title of book, author, illustrator, beautifully done, attractive, eye-catching, neat, etc.
- Neatness of writing
- Excellent illustrations, maps, diagrams, etc.
- Complete pictures to go with *all* information
- Creative

Content

- Reliably drawn observations to go with information
- Complete sentences
- Accurate mechanics
- Examples provided; supporting evidence
- Reliable observations
- Information: accurate, detailed, complete, thorough, documented, leaves reader with an understanding about the organism
- Introduction: gets reader's interest, sets purpose of book, overview of information
- Conclusion
- Topic sentence: clearly lets the reader know what is to follow

Writing Style

- Information flows easily from one subject to another
- Understandable for your audience
- Suggests pictures in reader's mind
- Holds reader's attention
- Starts in an interesting way

Purpose

- Clearly stated in introduction

Final Rubric for the Pond Life Book Project

Name _____
Date _____

CRITERIA	4-Superior	3-High Quality	2-Fair	1-Inferior
Purposes	Has a clear purpose which makes real-life connections	Has a clear purpose	The purpose is not directly stated	Has no purpose
Content	All information is accurate, detailed, and leaves the reader with a thorough understanding of the organism	Most information is accurate, detailed, and leaves reader with an understanding of each organism	Information contains some inaccuracies and lacks detail	Information is incomplete and contains many inaccuracies
Documentation of Information	Four or more varied, documented sources are used	Three documented sources are used	Has few documented sources	Sources are not documented
Organization	Has a highly organized plan with creative features	Has an organized plan	Has a vague plan	Has no plan of organization
Writing Style	Creative writing style suggests pictures in reader's mind and flows from one section to another	Interesting writing style holds the reader's attention	Uninteresting writing style but which does communicate information	Writing style is dull and boring
Illustrations/Visuals	Numerous, varied, attractive, appropriate visuals enhance the content throughout	Attractive, accurate visuals fit with the information	Few visuals, some of which may not fit directly with content	One or no visuals present
Presentation	The book is distinctive and eye catching; the content has a minimal number of mechanical errors	Overall, the book is attractive and neat, content has a number of errors which do *not* interfere with the communication of ideas	The book includes a cover; contains mechanical errors that interfere with communication of ideas	The book is sloppy and presentation lacks pride; the book fails to communicate author's ideas

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Pond Life Book Project Guidelines

Your Pond Life Book should include:

Organizational Framework

Cover

- Name of book, picture, author/illustrator's name

Title Page

- Title, your name, your teacher's name
- Grade and school
- Date

Table of Contents Page

- List any headings for the sections you have organized for your specimens.
- List all of your specimens and the page number on which the information is located.

  Example: Water Beetle ..... Page 1

Numbered Pages

- Each page must be numbered in the lower right hand corner.

Bibliography

- List each resource you used to research your specimens. The references should be in alphabetical order with the author's last name first.

  Format: author's last name, first name initial, name of resource (underlined), page number(s) your information was located on, publisher and location of publication, copyright date.

  Example: Reid, G., Pond Life, pages 14-18, Golden Press, New York, 1996.

Checklist for Essential Information Elements

Focus

- The purpose of my book is stated in the introduction. _____

Content

- Introduction: I have an introduction that includes the purpose of my book and any neccessary background information. _____
- Reflection Statement: I have stated my conclusions based on the data I found. _____
- Conclusion: I have referred back to my original purpose and given a final summary for my overall book. _____
- For each specimen, observation information is included. _____
- For each specimen, research information is included. _____

Organization

- My book has a plan of organization. _____

  Example: (a) Scientific Book: organisms are grouped with similar characteristics such as plant vs. animal, or macroscopic vs. microscopic; (b) Creative Story: with a beginning, middle, and an end.

Use of Language

- My writing style communicates my ideas. _____

Presentation

- I made an effort to present my book information using visuals as well as words. _____
- My finished book reflects effort. _____

Pond Life Book Planning Guide

Name: _____
Date: _____

I. The purpose of my Pond Life Book is:

II. The audience that my Pond Life Book is directed to is:

III. I plan to structure my Pond Life Book in this way:

IV. The written content of my Pond Life Book will include:

V. The visual content of my Pond Life Book will include:

VI. The materials I need for completing my Pond Life Book are:

Materials I have:

Materials I need to get:

VII. Calendar plan (What I will do when):

	Saturday/ Sunday	Monday	Tuesday	Wednesday	Thursday	Friday
Week 1						
Week 2						

VIII. Assessment: Here's how I'll know that I've met the goals of my plan:

A Generic Rubric Assessing Choice

Standards	Exemplary	Competent	Developing	Emergent
Students are able to recognize opportunities for choice.	In any given situation in which choices are available, the student is able to identify and articulate the choices.	In any given situation in which choices are available, the student identifies and articulates most or several of the choices.	In any given situation in which choices are available the student is able to identify a few of the choices and articulate some of these.	In any given situation in which choices are available the student is rarely able to identify or articulate the choices.
Students understand choices, are able to organize the choices, and recognize that choices can change.	The student prioritizes the choices with a clear, organized plan for making a selection.	The student prioritizes the choices with a plan for making a selection.	The student prioritizes the choices with a minimal plan for selection.	The student struggles to develop a plan for making a choice.
Students recognize the impact of choice and its effect on self and others.	Each time a student identifies a choice he/she clearly demonstrates an awareness of its effect on self and others.	Each time the student identifies a choice he/ she usually demonstrates an awareness of its effect on self and others.	Each time the student identifies a choice he/ she is sometimes able to demonstrate an awareness of its effect on self and others.	The student rarely shows an awareness of the effects of choice on self or others.
Students evaluate and reflect upon choice.	Each time a student makes a choice he/she develops and applies a plan for self-evaluation and reflection.	Most of the time when the student makes a choice he/she develops a plan for self evaluation and reflection.	Some of the time when the student makes a choice he/ she is able to develop a plan for self-evaluation and reflection.	The student rarely plans for self-evaluation or reflection relating to his/her choice.

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